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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

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FOREST INSECTS OF YOSEMITE PARK

by

J.E. PATTERSON
Assistant Entomologist

Drawings by W.D. EDMONSTON

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1929

Stanford University, California
May 1929

U. S. GOVERNMENT PRINTING OFFICE: 1929 J 76133

FOREST INSECTS OF YOSEMITE PARK

BY
J.E. PATTERSON, U.S. BUREAU OF ENTOMOLOGY

DRAWINGS BY W.D. EDMONSTON

The insects of Yosemite National Park are one of its most interesting forms of natural life. This park is richly favored with many species of insects, which upon acquaintance become very interesting to visitors. Among the many forms represented the group known as Forest Insects is of special interest because of their habits and the damage they cause to the park trees and shrubs. This group includes the species considered in this section.

While many of these species are not commonly observed except by the entomologist, others, because of their destructive habits, make their presence known even to the most casual observer. Two outstanding examples of the latter type are the lodgepole pine needleminer (Recurvaria milleri) and the mountain pine beetle (Dendroctonus monticolae).

An epidemic of the needleminer began years ago in the lodgepole pine stands on the Tuolumne and Tenaya watersheds and persisted with unabated vigor until 1925, when the epidemic to a great extent subsided. During the course of this epidemic great areas of forest were defoliated by the moth caterpillars. These repeated defoliations so greatly reduced the vitality of the affected trees that an epidemic of the mountain pine beetle which started about 1905 was able to spread with great rapidity throughout the defoliated stands. The devastation resulting from this beetle infestation was widespread, and many thousands of trees were killed. The dead "ghost forests" at Lake Tenaya and in the Tuolumne Meadows are mute evidence of these destructive epidemics. It is not often that so close a correlation exists between two damaging forest insects.

The Aspen Leaf Tyer
(Anacampsis populella Chamb.)

Description. This moth is dusky gray, with minute white wavy bars and spots on its forewings. The wings are rugose, with long grayish scales on the tips. The adults are one-half inch in length when at rest and have a wing spread of nearly one inch. The caterpillars are greenish gray with prominent black thoracic shields.

Occurrence. It is found throughout the park wherever the host, quaking aspen, occurs. Local places to look for it are the valley walls and the Little Yosemite.

Host. Populus tremuloides.

Habits and Seasonal History. The caterpillars feed on the surface of the leaves, tying from four to six together to form a nest, in which they are well protected from enemies. The leaves forming the nest are tied together at their edges by small strands of silk spun by the larvae. Attacked ~~needles~~ leaves are skeletonized and die. The pupae form in the leaf nests. Adults emerge in July and the eggs are laid on the current year's leaves.

The Bay Leaf Tyer
(Amorbia cuneana Wals.)

Description. The adult moth is golden brown with fuscous underparts, and has a wing spread of about one inch. They are very common during the latter half of July and in August about the host plants on most of the trails leading out of Yosemite Valley. The larvae are greenish in color and have the habit of tying from two to six leaves together, forming a nest for their food and protection. These nests are very conspicuous, so that the larvae within are easily found.

Occurrence. These leaf tyers are common throughout the valley floor and on its walls up to the 5,000-foot contour.

Host. Umbellularia californica.

Life History. The eggs are laid in late July and early August; the larvae soon hatch and form nests in which the winter is passed. Feeding is resumed the following spring and pupation occurs in early July within the larval nests.

The Lodgepole Pine Needleminer
(Recurvaria milleri Busck.)

Description. The adult is a small grayish moth with a wing expanse of 12 to 15 mm. The head, forewings and thorax are silvery gray marked with black. The eggs are oblong-oval, translucent, and measure 0.3 by 0.5 mm.; they are deposited at the base of the needles beneath the needle sheath. The mature larva is about 8 mm. in length. Its color varies from lemon yellow to deep orange. They inhabit the interior of attacked needles.

Occurrence. So far as is known at present, this moth is restricted to Yosemite Park, occurring throughout the Tuolumne watershed and in the Lake Tenaya basin. It was first reported in this park in 1903. During the years from 1906 to 1925 its status was highly epidemic, resulting in almost total annual defoliation of attacked trees. The epidemic began to subside in 1923 and at present is greatly reduced.

Host. This needleminer attacks only lodgepole pine.

Habits and Life History. The generations of the needleminer are biennial. Adults are found on alternate years and flight occurs every other year. The years of flight have been 1915, 1917, 1919 etc. Emergence and flight usually begin about July 1 and continue until August 15. During the peak of the flight period myriads of moths are about in the forest, and thousands of them fall into the lakes and streams and are washed up on the beaches, where they are deposited in windrows. During this period the flying moths become a pest to campers in the infested regions, as they invade tents and fall into cooking utensils and provisions. Eggs are deposited at the base of the needles, and when the young caterpillars hatch they crawl to near the needle tip and enter the axis by boring through the epidermis. The larvae feed on the interior of the needles and pass the first winter in the needles first attacked. After the second winter they migrate to unmined needles, where their final growth is completed. They pupate in these needles and emerge through holes previously made by the larvae. The greatest amount of defoliation occurs during the second feeding period of the larvae, just before pupation; so it happens that mined needles are more conspicuous on alternate years, which are also the years of flight.

Literature. Patterson, J.E. 1921 Jour.Agr.Res.Vol.21 No.3 pp.127-141 pl.2.

The Amber-Winged Horntail
(Urocerus californicus Norton)

Description. The females are large, wicked-looking wasps with black body, yellow legs and amber wings. They measure from 1¼ to 2 inches in length and have ovipositors almost as long as the body. The males have dark-orange-colored bodies and are much smaller than the females. The females drill holes in the solid wood of dying and recently-cut trees, in which the eggs are laid. This habit has led to the popular belief that the sting of the horntail causes the death of trees. Although there is no basis for this supposition, since they do not attack living trees, it persists widely among woodsmen.

Occurrence. The horntail is found throughout the park, being quite common in the Little Yosemite, around Lake Tenaya and in the fir forests above the valley walls.

Hosts. Lodgepole pine, Douglas fir, white fir and probably other species.

Life History. The eggs are placed in holes drilled by the females in solid wood, usually from ⅛ to ¼ inch beneath the surface. The larvae feed on the wood and later pupate in oblong cells beneath the surface. The adults emerge through circular holes that are characteristic of this insect.

Literature. Bradley, J.C. 1913 P.C.Jour.Ent.& Zool.V pp.1-30.

The Carpenter Ant
(Camponotus herculeanus var. modoc Wheeler)

Description. The adults are large shiny black ants almost ¾ inch long, and are commonly seen crawling about singly on the ground and down logs. The winged males and females develop large amber-colored wings. They live in large colonies in fallen logs, standing trees and stumps. Their nests consist of an intricate system of galleries excavated in solid wood. The soft layers of the wood are usually mined, leaving only the hardened portion of the annual rings.

Occurrence. They are found throughout the park and are common in Yosemite Valley and the big tree groves. The big tree, Sequoia gigantea, is often selected for their nests. The marginal illustration shows a piece of redwood taken from a nest in a fallen bigtree.

Literature. Wheeler, W.M. 1920

The Short-Winged Lion Beetle
(Ulochaetes leoninus Lec.)

Description. The adult is about one inch long and looks as much like a bumblebee as it does a beetle, since the wing covers or elytra are very short and do not hide the wings and abdomen. The body is dark to black and the wings as well as the tips of the elytra are yellow-amber. This species during the larval stage bores in dead roots, basal trunks and stumps of pines, firs and hemlocks. Pupation occurs in cells at the termination of the larval burrows, and the adults emerge through circular holes cut to the surface.

Occurrence. Generally thruout the park. It is very common on the valley floor and in Little Yosemite.

Hosts. Yellow pine, sugar pine, Jeffrey pine and lodgepole pine. It alsoattacks both white and red fir and hemlock.

The Yellow Pine Roundheaded Bark Borer
(Graphisurus spectabilis Lec.)

Description. The adult is a large mottled gray beetle, $\frac{3}{4}$ inch long, with very long antennae. The antennae of the males are sometimes over 3 inches in length, while the female "feelers" are usually much shorter. The long feelers will at once serve to identify the species. The larvae are the common white grubs or "fishworms" found under the bark of recently-dead trees.

Occurrence. They are found throughout the yellow pine and lodgepole pine stands within the park. They almost always infest trees recently killed by Dendroctonus beetles.

Hosts. Yellow pine, lodgepole pine and probably the other park pines.

Habits and Life History. The larvae are strictly bark feeders, though they sometimes enter the outer layers of wood of thin-bark trees. Pupae form in cells either in the outer bark or just beneath the surface of the sapwood. In the park, eggs are laid in June and July. The larvae feed until the following spring, pupation taking place in May and June. Adults appear in June and July.

Literature. Craighead, F.C. 1923 Bul.27 N.S.Dom.Can.Dep.Agr.

The Mountain Carpenter Bee
(Xylocopa orpifex Smith)

Description. The adults are very large robust greenish-black bees, somewhat resembling bumblebees but lacking the yellow markings. The females are nearly unform in color, but the males are distinguished by the presence of yellow hairs on the pronotum. The mature larvae are yellowish-white, robust and 3/8 inch long.

Occurrence. The carpenter bee is found on the valley floor, along the Wawona Road and in the Mariposa and Tuolumne big tree groves.

Hosts. It attacks incense cedar, sequoia and Douglas fir.

Habits and Life History. The adults excavate large burrows in dead wood, and prefer cedar and redwood in this park. The burrows are at first straight and then turned upward, and are from 5 to 12 inches in length. The bees work close together and form a colony in the attacked material. The galleries are partitioned into cells, each of which is supplied with an egg and provisioned with an amount of honey pollen about the size of the bee's body. After hatching, the larva feeds upon this pollen. The larvae feed for about a month, and after resting from 15 to 20 days pupate. Pupation requires about 15 days, when the adults emerge. A colony of these bees formerly occupied a nest in a large cedar electric light pole in the old village, where they were very conspicuous and noisy during the day. The adults are able to, and do, inflict a very painful wound if handled carelessly.

Literature. Fox, W.J., 1892 Ent.News 3 p.17

The Lodgepole Pine Twig Moth
(Petrova metallica Busck)

Description. The adult is purplish-brown with metallic scales. The thorax is whitish, dusted with grayish fuscous scales, and the wing spread is 16 to 19 mm. Adults may be found about attacked trees in June and July, and because of their brilliant colors will not fail to attract attention. The larvae are greenish-white and live within pitch nodules near the tips of branchlets and twigs.

Occurrence. It is found throughout the park lodgepole pine forests. Local places to look for it are the Little Yosemite, Snow Creek Flats, Lake Tenaya and Tuolumne Meadows.

Host. Lodgepole pine.

Habits and Seasonal History. Eggs are laid by the adults in June and July. The larvae attack the twigs, causing a pitch nodule to form on the stem. This injury usually causes the death of the twig beyond the nodule. The larvae live for almost two years within the nodules originally formed, and pupation also occurs here. The species has a life cycle of two years.

Literature. Heinrich, Carl 1923 Bul.123 U.S.Nat.Museum

The Yosemite Bark Weevil
(Pissodes yosemite Hopk.)

Description. The adult is a small reddish-brown beetle with a long snout and a conspicuous white patch on either elytron. The length is 5/16 inch and the width 2/16 inch. The egg is white, oval and about 1/32 inch in length. The grub is white, legless, and about 5/16 inch in length. The head and mouth parts are dark brown. The pupa is white, with the beak, legs and wings folded on the breast.

Occurrence. The bark weevil occurs on the floor of the valley and probably throughout the Sierras wherever the yellow pine grows.

Host. The yellow pine is the principal host. Specimens have also been taken from the sugar pine.

Habits and Life History. Little is known on the habits of thés species. The adults probably emerge during the late summer or fall, feed on the foliage for awhile and overwinter in the old needles and other debris at the base of the trees. During June or July they emerge from the debris, feed on the foliage, mate and lay eggs in the bark at the base of injured or dying trees. The grubs soon hatch from these eggs and mine the bark and outer wood, feeding and growing. In six weeks or more they become full-grown and form a cell in the outer wood which they cover with shredded borings. Within this cell they soon pupate and transform to the adult, which emerges and feeds on the foliage for a time before hibernating on the ground in the debris.

Bibliography. Hopkins, A.D. 1911 Tech.Ser.Bul.20 Pt.1 Bur.Ent. USDA.

The Willow Sac Scale
(Eriococcus borealis Ckll.)

Description. The adult female is reddish and completely enclosed in a grayish felt-like oval sac about 1/8 inch long. The male sac is white and about 1/14 inch long. The females, crowded along the crevices of the bark, and the males, scattered about on the bark of the branches and trunks of many of the willows around Mirror Lake, are very conspicuous. The first-stage larva is brownish-red in color, 1/16 inch long, has six legs and a back marked by numerous transverse ridges.

Occurrence. Common on the floor of the valley, especially around Mirror Lake.

Host. Yellow willow.

Habits and Life History. Very little is known about the species. The females are enclosed in the sac and lay their eggs there. The males leave their sacs and mate with the females in the sacs. The eggs probably hatch in the summer and the young crawl to new places on the bark, where they insert their beaks and start to sucking and growing. During the winter they protect themselves as much as possible by keeping in the crevices of the bark and other protected places on the bark. In the spring they start to feeding and growing again. When full-grown the females form their sacs in the crevices of the bark and the males theirs scattered over the bark. So far as known no serious damage has been caused in the Yosemite by this species.

Bibliography. Essig, E.O. 1928 P.76 Vol.V Pan-Pac.Ent.

The Oak Heartwood Borer
(Buprestis gibbsi Lec.)

Description. The adult female is a beautiful oblong-oval blue-green beetle marked with six large waxy yellow spots which are sometimes tinted with reddish orange. The length is $\frac{3}{4}$ inch and the width about $\frac{1}{4}$ inch. The male is similar, a little smaller, and has the tip of the fore tibiae armed with a hook. The full-grown larva is white, about $1\frac{1}{2}$ inches long, and the first four segments form a larger headlike portion from the slenderer body. The pupa is white when first formed and the wings and legs are folded on the breast. Later the colors of the adult are slowly developed.

Occurrence. The heartwood borer occurs wherever black oak is found.

Host. The black oak and probably other oaks are hosts.

Habits and Life History. The adults emerge from the wood in the spring or summer, mate, and the female lays groups of eggs in crevices in the wood of scars on living trees. The eggs hatch in about a month and the larvae bore in the heartwood for several years. Some spring they become full-grown, form a cell in the wood, pupate and transform to beetles, which soon emerge to start a new generation. Practically all the mining is done in the heartwood of living trees. Serious damage is seldom caused by this species.

Bibliography. Burke, H.E. 1920 P.74 Vol.22 Ent.Soc.Wash.

The Alder Flathead
(Agrilus burkei Fisher)

Description. The adult is a small, slender, cobalt-blue beetle about 3/8 inch long and 3/32 inch wide. The egg is flattened and scale-like and laid in a circular mass of from 5 to 8 eggs and covered with a yellowish or whitish secretion. The full-grown larva is about an inch in length,,white, slender, with the first segment longer than the others and with the last bearing a pair of dark forceps-like projections.

Occurrence. The alder girdler occurs along the Merced River, especially at the lower end of the valley. The same or a similar species is found near the top of the Ledge Trail.

Host. The white, alder, mountain alder and possibly the mountain maple are hosts of this species.

Habits and Life History. The adults emerge from the wood in May and June and fly to the leaves, where they feed and mate. The females then fly to the bark, where they lay their eggs. The larvae soon hatch from the eggs by boring through the bottom down through the bark to the wood. They mine the inner bark and outer wood until the next spring, when they become full-grown and bore into the wood or outer bark and form a cell, in which they pupate and transform to the beetle. The beetle gnaws its way out of the end of the cell to the surface of the bark and flies to the foliage to start the new generation.

Bibliography. Burke, H.E. 1917 p.331 Vol.10 Jour.Ec.Ent. Agrilus sp.

The Big Tree Heartwood Borer
(Trachykele opulenta Fall)

Description. The adult is a beautiful velvety green oblong-oval beetle ½ to 4/5 inch in length. There is a large pit and a median ridge on the thorax and usually three black patches on each elytron. The tip of the ventral plate of the abdomen of the female is rounded and that of the male truncate. The full-grown larva is white and about 1½ inches in length. The dorsal plate of the first segment is marked with an inverted V of depressed grooves which has a large depressed area surrounding the apex.

Occurrence. The heartwood borer occurs wherever the big tree and the incense cedar grow.

Hosts. The big tree and the incense cedar are the known hosts.

Habits and Life History. The beetles emerge from the wood in the spring, mate, and the female lays the eggs on the wood at the edge of a scar or a dead branch in the top. In about a month the eggs hatch and the young borer mines into the heartwood of the tree. It mines and feeds in the wood for several years until some summer it becomes full-grown. It then excavates a cell in the wood near the surface of a scar, pupates and transforms to a beetle. The beetle rests over the winter in the cell and emerges the next spring.

Bibliography. Burke, H.E. 1910 p.408 Yearbook USDA 1909

The Pine Bark Loosener
(Callidium antennatum Newm.)

Description. The adult is a flat, bluish-black beetle, from 2/5 to 3/5 inch long. The larva, a yellowish-white grub about 4/5 inch in length when full-grown, attacks seasoned timber and logs, feeding between the bark and the wood. When mature, the larva bores into the wood to make a gallery, in which it overwinters and transforms to the adult beetle stage. It is very damaging to seasoned timber and rustic work where the bark is not removed from the logs.

Occurrence. The bark loosener occurs throughout the park yellow pine forests. It should be found locally in the valley and along the Wawona Road.

Hosts. Yellow pine and sugar pine.

Seasonal History. The female beetle deposits her eggs on the bark surface during the early spring months. After hatching, the larvae at first feed on the inner bark, deeply scarring the sapwood. They then enter the wood to form the overwintering galleries, when the change to pupae and new adults takes place. The larvae feed throughout the summer months. The overwintering period lasts through the fall, winter and early spring months. The overwintering stages consist of both larvae and pupae. New adults begin to form early the following spring and emerge before the last of June.

The Amethyst Roundhead
(Semanotus amethystinus Lec.)

Description. The amethyst roundhead is a beautiful iridescent purple beetle about 1½ inches in length. The medium-sized larvae are yellowish white and are found in rather large galleries in incense cedar. They excavate broad winding burrows in the bark, sapwood and heartwood of attacked trees and logs. Because of their brilliant color and large size the adults cannot fail to attract the attention of park visitors.

Occurrence. Valley floor, Chinquapin, Gentry's and Mariposa Grove.

Host. Incense cedar in the park.

Seasonal History. Eggs are laid in the bark crevices during the early summer. Larvae hatch and feed on the inner bark and sapwood until fall, when galleries are made into the heartwood. Pupation occurs the following spring in cells under the surface of the sapwood. The new adults emerge in June and July.

The Jeffrey Pine Beetle
(Dendroctonus jeffreyi Hopk.)

Description. The adult is a stout black cylindrical hard-shelled beetle about ¼ to 5/16 inch long, being slightly larger than the mountain pine beetle. The larvae are white, legless grubs. The pupae are white, formed in cells of the inner bark, and are exposed to view when the bark is removed.

Occurrence. It is not uncommon in the Jeffrey pine forests of the Little Yosemite, Illilouette Basin, Snow Creek Basin and above Yosemite Falls. Many fine trees in the park were killed in former years by this beetle, though at present their numbers are small.

Host. Jeffrey pine (Pinus jeffreyi).

Habits and Seasonal History. The habits and work of this beetle are very similar to those of the mountain pine beetle. Large reddish pitch tubes form on the bark where the beetles force their entrance, and are unmistakable evidence of attack. The egg tunnels are usually two or three feet in length and parallel the trunk of the tree. Eggs are deposited in niches on both sides of these galleries, and the larvae in hatching work out across the grain of the wood. The pupal cells are formed in the inner bark. The adults fly and attack during July and August, and the new broods reach the larval stage by the time winter sets in. In the spring development continues, and most of the new brood emerge in July and August.

The Western Cedar Bark Beetle
(Phloeosinus punctatus Lec.)

Description. The adult is a small brown to black cylindrical beetle with striated elytra, about 1/8 inch long. They resemble the Dendroctonus beetles but are much smaller. The larvae are white, legless grubs, found under the bark of dying cedar trees. In emerging, the adults make small round holes in the bark, and their presence on a tree indicates that the brood has developed and emerged.

Occurrence. This beetle is common in Yosemite Valley, along the Wawona Road and in the Mariposa Grove.

Host. It attacks incense cedar (Libocedrus decurrens).

The Cottonwood Carpenter Worm
(Acossus populi Walker)

Description. The adult female is a large gray moth with a wing spread ofabout 2½ inches and a body length of 1½ inches; there are some dark wavy transverse lines and dark patches on the wings. The antennae are threadlike. The males are similar to the females, but are smaller and their antennae are more feathery. The eggs are dark brown, ovate, and the surface is covered with large pits. The caterpillar is pinkish white, two or more inches in length and fairly smooth. The chrysalis is dark brown or blackish in color and bears two transverse rows of long spines on five of the segments and one on each of the last three.

Occurrence. The cottonwood carpenter worm occurs along the streams in the Sierras where the cottonwood grows; it is common on the floor of the valley.

Host. It infests black cottonwood, willow and possibly aspen.

Habits and Life History. The moths emerge from the wood of infested trees about the first of June; they fly from tree to tree and mate. The female lays her eggs on the bark near scars or in crevices of the bark. The eggs hatch in several weeks and the young caterpillars mine down in the inner bark and outer wood, where they feed for awhile before boring into the wood. Several years are spent in the tree and large open mines are bored through the wood, damaging it. Some spring the caterpillar retreats slightly in the mine and forms the chrysalis, which wriggles out of the mine when the adult is ready to emerge. The empty chrysalis protruding from the mines can be seen on many cottonwoods growing on the floor of the valley.

Bibliography. Essig, E.O. 1926 P.754, Insects of W.N.Amer.

The Oyster Shell Scale
(Lepidosaphes ulmi Linn.)

Description. The adult female is a small, legless, soft-bodied insect, covered by a brownish or grayish oystershell-like scale about 1/8 inch in length. Usually the bark of infested branches is so covered by the scales that it looks encrusted. The eggs are tiny white oval objects about 1/80 inch in length. The first stage or crawling larva is about the same size as the egg, whitish and has six legs. The larva of the second stage resembles the female. The male has never been found in America; it is a tiny, active, two-winged insect with long antennae.

Occurrence. The oyster shell scale is common on the floor of the valley.

Host. It occurs on cottonwood, willow and creek dogwood, and kills many bushes and trees.

Habits and Life History. About the first of June the eggs hatch into larvae, which crawl into vacant spaces on the bark of branches and twigs. They soon insert their beaks into the bark, suck the sap and exude waxy threads which unite to cover them with a whitish scale. In about three weeks they transform to the second stage, which is legless. This also exudes a scale and sucks sap for about three weeks, when it sheds its skin and transforms to the young female, which feeds for about a month, grows and forms the final scale. It then begins to lay eggs under the scale, packing them snugly together behind its body, which becomes smaller and smaller as the mass of 50 to 100 eggs is deposited. These remain well protected under the scale of the mother until the next June, when they hatch into the crawlers that form the next generation. There is one annual generation. The eggs are laid by August 15 and hatch about the first of the next June.

Bibliography. Cooley, R.A. 1924 Circ. 124, Mont.Agric.Exp.Sta.

THE FLATHEADED CONE BEETLE
(Chrysophana placida Lec.)

Description. The adult is a pretty green, coppery, or coppery and green oval beetle about 5/16 to 7/16 inch long and 2/16 to 3/16 inch wide. The egg has not been seen. The larvae are white grubs about half an inch long, with dark jaws and the first segment of the body broader than the rest and marked on both surfaces by a straight median line or groove.

Occurrence. The flatheaded cone beetle is found throughout the park at all elevations where trees grow.

Hosts. It attacks the cones of the knobcone and Coulter pine and the wood of all species of pines, firs, Douglas fir and the hemlock.

Habits and Life History. The adults emerge from the wood during the spring and summer and lay their eggs on the mature cones or on the wood of dead branches, tops, or scars on live trees. The larvae hatch and mine the wood for several years before becoming full-grown. During the summer that they become full-grown they pupate in a cell in the wood and transform to beetles, which remain in the cell until the next spring or summer before emerging. Dead lower suppressed branches on live trees are usually inhabited by this species. Old blazes and fire scars usually show their work.

Bibliography. BURKE, H.E. 1917 Jour.Econ.Ent.Vol.10 p.406.

THE BIG TREE BARKBEETLE
(Phloeosinus rubicundulus Sw.)

Description. Small beetle, 3/25 inch long, with a brown ridged body and a blackish thorax which narrows toward the front. The egg is white, oval and 1/25 inch long. The grub is somewhat cylindrical, white, legless, from 1/25 to 4/25 inch long, and has a dark brown head. The pupa is white, about the same size as the beetle, with the legs and wings folded on the breast.

Occurrence. The big tree beetle occurs in the Mariposa, Tuolumne and other groves of the big tree.

Host. So far as known, the big tree barkbeetle infests only the big tree.

Habits and Life History. Very little is known of this species. Apparently the beetles attack recently-felled or dying branches in the late spring or early summer, and excavate longitudinal galleries for an inch or more in the inner bark and outer wood. In little niches along the sides of the gallery the eggs are laid and packed in with boring dust. The eggs soon hatch into grubs, which mine the inner bark until they become full-grown, when they pupate and transform to new beetles. The pupal cells are usually found formed in the inner bark, but sometimes they mark the wood or are formed entirely in it.. The transformation to new beetles may take place in the fall or the spring. Some of the beetles may emerge in the fall and attack twigs or live trees. These twigs are mined, probably for food or protection; often they break over and hang suspended in a very characteristic manner.

Bibliography. SWAINE, J.M. 1924 Can.Ent.Vol.LVI p.144.

THE PINE BUTTERFLY
(Neophasia menapia Felder)

Description. This butterfly has a wing spread of about two inches. The body is slender and dark. The wings are white, marked with dark bars and in the female sometimes edged with orange spots. The eggs are shaped like flasks, emerald green in color, about 1/16 inch in length and laid in a row along a pine needle. The full-grown caterpillar is an inch long, dark greem with two white stripes on each side and with the headaand tail covered with raised white tubercles. The chrysalis is about ¾ inch long and pale green.

Occurrence. The pine butterfly is found where the yellow pine and Jeffrey pine grow.

Hosts. The yellow pine is the preferred host, but the caterpillars will feed on most of the pines and also Douglas fir and other conifers.

Habits and Life History. The butterflies like to fly around the foliage of the trees. The eggs are laid during the late summer, overlapping in a row on the needles. They hatch the next spring about the time the new needles appear. The first-stage larvae feed in a group around a needle, eating only the pulp. Later they separate and eat the entire needle. Most of them are full-grown about the last of July, when they lower themselves by a long silken thread and form the chrysalis on shrubs, grasses, tree trunks or foliage of any kind. In about two weeks after forming the chrysalis the butterfly emerges, mates, and flying to the trees lays its eggs, which overwinter before hatching to produce the next generation of caterpillars. The species causes serious defoliation to the yellow pine in Montana, Idaho and Washington. It has never been reported as injurious in California.

Bibliography. EVENDEN, J.C. 1926 Jour.Agr.Res.Vol.33 p.339.

YOSEMITE FOREST INSECT MANUAL

List of additional insects to be included in the check list (bound).

These numbered species should be inserted where their corrss-ponding numbers appears in the bound check list.

INSECT GROUP	STATUS AND HOST PLANT	PAGE
CAMBIUM FEEDERS -		
1. -Callidium antennatum Newm. PINE BARK LOOSENER	Not common. Found in beetle killed yellow pine.	
2 - Dendroctonus jeffreyi Hopk. JEFFREY PINE BEETLE	Common in stands of Jeffrey pine in Little Yosemite.	
3 - Graphisurus spectabilis, Lec. YELLOW PINE ROUNDHEAD BARK BORER.	Common in yellow pine in Yosemite Valley and along the Wawona Road.	
4 - Pissodes yosemite Hopk. YOSEMIEE BARK WEEVIL	Attacks yellow pine and sugar pine and is common at Alder Creek and in the Big Trees groves.	
5 - Phloeosinus punctatus Lec. WESTERN CEDAR BARKBEETLE	Attacks incense cedar. Very common in Yosemite Valley.	
6 - Phloeosinus rubicundulus Sw. BIG TREE BARKBEETLE	Commonly found in fallen limbs of Sequoia in all three BIG Tree groves.	
DEFOLIATORS -		
7 - Amorbia cuneana Wals. BAY LEAF TYER	Its nests are common on the bay in the Valley and on valley trails.	
8 - Anacampsis populella Chamb. ASPEN LEAF TYER	Very common on quaking aspen in the Little Yosemite.	
9 - Neophasia menapia Feld. PINE BUTTERFLY	Not common. A white butterfly found in the lower elevation pine forests of the Park.	
10 - Recurvaria milleri Busck. LODGEPOLE PINE NEEDLEMINER	Formerly the most common forest insect of the Park. Occurs at Lake Tenaya and in Tuolumne Meadows	

mmm-

WOOD BORERS -

11 - Acoessus populi Walk. — Not common. Found in Valley along Merced River in cottonwood.
COTTONWOOD CARPENTER WORM

12 - Agrilus burkei Fisher. — Common in alder along the Park streams.
ALDER FLATHEAD

13 - Buprestis gibsii Lec. — Common woodborer of the oak forets. Found in the valley and on lower Merced River.
OAK FLATHEAD WOODBORER

14 - Camponotus herculeanus modoc Wheel. — Very common throughout the Park. Nests in larger dead trees.
WESTERN CARPENTER ANT

15 - Chrysophana placida Lec. — Very beautiful green beetle common in lodgepole pine at Lake Tenaya.
THE ~~PLACID BUPRESTID~~ Flatheaded Borer Beetle

16 - Semanotus amethystinus Lec. — Large violet-blue beetle common in incense cedar forests.
AMETHIST ROUNDHEAD

17 - Trachykele opulenta Fall. — Found in all the Big Tree groves. Attacks the Sequoia.
BIG TREE BORER

18 - Ulochaetes leoninus Lec. — Common in Little Yosemite. Resembles large bumblebee.
SHORT-WINGED LION BEETLE

19 - Urocerus californicus Nort. — Large black and amber wasp with long ovipositor. Bores in solid wood of dying trees. Common.
AMBER-WINGED HORNTAIL

20 - Xylocopa orpifex Smith. — Large greenish-black bees. Nest in cedar and big tree. Common in Valley.
CARPENTER BEE

CONE INSECTS -

21 - Petrova metallica Busck — Makes pitch nodules on twigs of lodgepole pine. Common at Snow Flat and at Lake Tenaya.
LODGEPOLE PINE TWIG MOTH

SAPSUCKERS -

22 - Eriococus borealis Ckll. — Small black scale common on willows at Mirror Lake and on Merced River.
WILLOW SAC SCALE

23 - Lepidosaphes ulmi Linn. — Large whitish scale occurring in masses on cottonwood in Yosemite Valley.
OYSTER SHELL SCALE